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10/540,652	04/17/2006	Jens Schneider	10191/4257	7198

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EXAMINER	
RIPA, BRYAN D	

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1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/540,652	Applicant(s) SCHNEIDER ET AL.	
	Examiner BRYAN D. RIPA	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 17, 2010 has been entered.

Response to Amendment

In response to the amendment received on March 17, 2010:

- claims 11-15 are presently pending
- all previous prior art rejections are withdrawn
- new grounds of rejection presented below

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 11-14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hotta et al., (U.S. Pub. No. 2002/0060152) (hereinafter referred to as “HOTTA”) in view of Friese et al., (U.S. Pat. No. 5,368,713) (hereinafter referred to as “FRIESE”).

Regarding claim 11, HOTTA teaches a measuring sensor for determining a physical property of a measured gas (see generally ¶2), comprising:

- a sensor element (see oxygen sensor element 1) capable of being exposed to the measured gas, the sensor element including a ceramic element made of solid electrolyte layers, an outer electrode situated on a surface of the ceramic element and a porous protective lining coating the outer electrode (see solid electrolyte body 10, target gas electrode 11 and electrode protective layer 13 coating the outer surface of the target gas electrode 11 as claimed); and
- a protective layer at least partially coating the sensor element (see catalytic layer 14 coating oxygen sensor element 1) capable of protecting against harmful components in the measured gas, the protective layer covering the porous protective lining (see catalytic layer 14 covering electrode protective layer 13) wherein the protective layer includes γ-aluminum oxide having an additive of the lanthanide group (see ¶38 teaching catalytic layer 14 comprising γ-aluminum oxide to which La_2O_3 is added; see also ¶44 and ¶45) and wherein a material of the protective lining includes zirconium oxide having a small proportion of aluminum oxide (see ¶38 teaching electrode protective layer 13 comprising a heat resistant metallic oxide including the combination of alumina and zirconia).

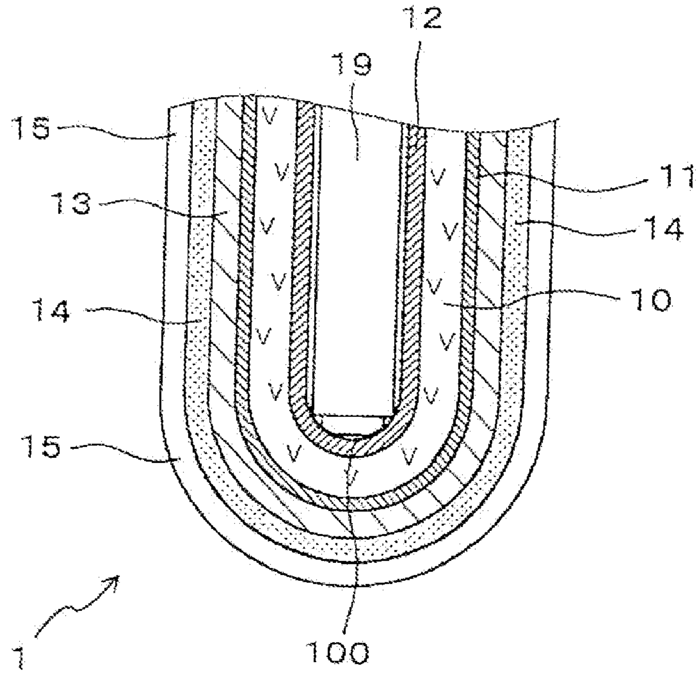


FIG. 1

Although HOTTA teaches the catalytic layer 14, i.e. the protective layer, having at least 95% aluminum oxide (see ¶45 teaching the amount of La_2O_3 being between 0.5% and 5%), since HOTTA fails to explicitly teach the specific composition of the protective lining comprising zirconium oxide and aluminum oxide, HOTTA also fails to explicitly teach the measuring sensor wherein the protective layer has a substantially higher proportion of aluminum oxide than the protective lining.

However, FRIESE teaches an electrode protective layer comprising zirconium oxide and aluminum oxide wherein the composition of the protective layer is 75% zirconium oxide and 25% aluminum oxide (see col. 3 lines 11-13 teaching porous covering layer 12, i.e. the electrode protective layer, comprising 75% zirconium oxide and 25% aluminum oxide by weight).

Consequently, as shown by FRIESE, a person of ordinary skill in the art would accordingly have recognized the use of a protective layer having the compositional makeup as disclosed as the combined zirconium and aluminum oxide electrode protective layer.

The selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Moreover, since the composition of the zirconium and aluminum oxide protective layer of FRIESE was known in the art to be used as an electrode protective layer, i.e. the protective lining, one of ordinary skill in the art would have readily appreciated that it could be used for that purpose. Furthermore, the use of composition disclosed by FRIESE would result in the measuring sensor having a protective layer with a substantially higher proportion of aluminum oxide than the protective lining.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the specific composition of the electrode protective layer of FRIESE in the measuring sensor of HOTTA as a protective layer immediately adjacent to the outer electrode.

Regarding claim 12, HOTTA teaches the measuring sensor wherein the measuring sensor is for determining an oxygen concentration in an exhaust gas of an internal combustion engine (see ¶2).

Regarding claim 13, HOTTA teaches the measuring sensor wherein the additive is an oxide of an element in the lanthanide group (see ¶38 teaching the additive being La_2O_3).

Regarding claim 14, HOTTA teaches the measuring sensor wherein the protective layer is extremely porous and has a great layer thickness (see ¶49 teaching the catalytic layer 14, i.e. the protective layer, being porous).

2. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jain et al., (U.S. Pub. No. 2003/0230484) (hereinafter referred to as “JAIN”) in view of FRIESE with evidence from HOTTA.

Regarding claim 11, JAIN teaches a measuring sensor for determining a physical property of a measured gas (see generally ¶12), comprising:

- a sensor element (see figure 1b) capable of being exposed to the measured gas, the sensor element including a ceramic element made of solid electrolyte layers, an outer electrode situated on a surface of the ceramic element and a porous protective lining coating the outer electrode (see electrolyte 20, measuring electrode 21 and first protective coating 24 coating the outer surface of measuring electrode 21 as claimed); and
- a protective layer at least partially coating the sensor element (see second protective coating 23) capable of protecting against harmful components in the

measured gas, the protective layer covering the porous protective lining (see second protective coating 23 covering first protective coating 24) wherein the protective layer includes γ-aluminum oxide having an additive of the alkaline earth group and lanthanide group (see ¶39 teaching second protective coating 23 comprising γ-aluminum oxide and δ-aluminum oxide to which lanthanum oxide, calcium oxide, barium oxide or strontium oxide is added) and wherein a material of the protective lining includes zirconium oxide having a small proportion of aluminum oxide (see ¶33 teaching first protective coating 24 comprising a combination of alumina and zirconia).

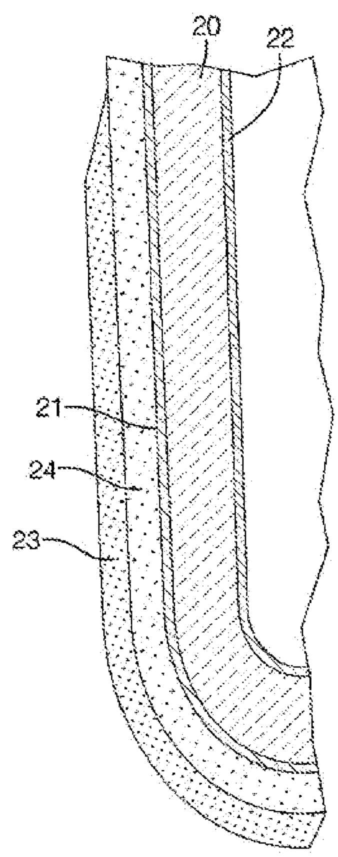


FIG 1 B

Although JAIN teaches the first protective coating 24 and the second protective coating 23 having the required components, JAIN fails to explicitly teach the specific composition of the respective coatings and, consequently, therefore fails to teach the measuring sensor wherein the protective layer has a substantially higher proportion of aluminum oxide than the protective lining as claimed.

However, FRIESE teaches a first protective coating comprising zirconium oxide and aluminum oxide wherein the composition of the protective layer is 75% zirconium oxide and 25% aluminum oxide (see col. 3 lines 11-13 teaching porous covering layer 12, i.e. the electrode protective layer, comprising 75% zirconium oxide and 25% aluminum oxide by weight).

Consequently, as shown by FRIESE, a person of ordinary skill in the art would accordingly have recognized the use of a protective layer having the compositional makeup as disclosed as the combined zirconium and aluminum oxide electrode protective layer.

The selection of a known material, which is based upon its suitability for the intended use, is within the ambit of one of ordinary skill in the art. See *In re Leshin*, 125 USPQ 416 (CCPA 1960) (see MPEP § 2144.07).

Moreover, since the composition of the zirconium and aluminum oxide protective layer of FRIESE was known in the art to be used as an electrode protective layer, i.e. the protective lining, one of ordinary skill in the art would have readily appreciated that it could be used for that purpose.

Furthermore, as evidenced by HOTTA, the addition of a small amount of lanthanum oxide to stabilize the porous aluminum oxide protective layer containing γ-aluminum oxide is known in the art (see HOTTA at ¶45 teaching the amount of La_2O_3 being between 0.5% and 5%). Consequently, the use of the composition as disclosed by FRIESE would result in the measuring sensor having a protective layer with a substantially higher proportion of aluminum oxide than the protective lining.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the specific composition of the electrode protective layer of FRIESE in the measuring sensor of HOTTA as a protective layer immediately adjacent to the outer electrode.

Regarding claim 12, JAIN teaches the measuring sensor wherein the measuring sensor is for determining an oxygen concentration in an exhaust gas of an internal combustion engine (see ¶1-¶3 and ¶12 teaching the gas sensor being an oxygen sensor for use in the exhaust gas of an internal combustion engine).

Regarding claim 13, JAIN teaches the measuring sensor wherein the additive is an oxide of an element in the alkaline earth group and the lanthanide group (see ¶39).

Regarding claim 14, JAIN teaches the measuring sensor wherein the protective layer is extremely porous and has a great layer thickness (see ¶39 teaching the details of second protective coating 23 which would inherently be porous as claimed since the

measurement gas must reach measuring electrode 21 in order for a measurement to occur based on the gas sensor).

Regarding claim 15, JAIN teaches the measuring sensor wherein a thickness of the protective layer is greater than 250 µm (see ¶39 teaching the second protective coating 23 having a thickness up to 500 µm).

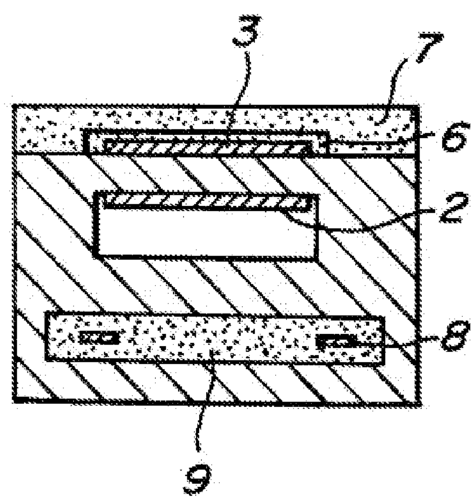
3. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogasawara et al., (U.S. Pat. No. 5,271,821) (hereinafter referred to as “OGASAWARA”) in view of Friese (U.S. Pat. No. 4,296,148) (hereinafter referred).

Regarding claim 11, OGASAWARA teaches a measuring sensor for determining a physical property of a measured gas (see generally col. 1 lines 27–39 discussing the measuring sensor being an oxygen sensor for determining the oxygen concentration in an exhaust gas of an automobile and figure 3b below) comprising:

- a sensor element (see col. 2 lines 33–41 and portion of figure 3b below upper protective layer 7) capable of being exposed to the measured gas, the sensor element including a ceramic element made of solid electrolyte layers, an outer electrode situated on a surface of the ceramic element and a porous protective lining coating the outer electrode (see figure 3b below comprising a ceramic element made of solid electrolyte layers having an outer electrode with lower protective layer 6, i.e. the porous protective lining, coating electrode 3); and

- a protective layer at least partially coating the sensor element (upper protective layer 7) capable of protecting against harmful components in the measured gas, the protective layer covering the porous protective lining (see upper protective layer 7 covering lower protective layer 6) wherein the protective layer includes γ-aluminum oxide having an additive of the alkaline earth group (see generally col. 4 lines 12–16 and col. 7 lines 5–9 teaching the use of γ-aluminum oxide with magnesia particles to form the protective layer; see also the embodiment shown in figure 8 and discussed at col. 7 lines 5-9 teaching the outer protective layer comprising magnesium in a γ-alumina layer that is coating protective layer 22 or the lower protective layer 6).

FIG. 3b



OGASAWARA, however, does not explicitly teach (1) the material of the lower protective layer, i.e. the protective lining, including zirconium oxide having a small proportion of aluminum oxide and (2) the protective layer having a substantially higher proportion of aluminum oxide than the protective lining.

However, FRIESE teaches the use of a lower protective layer wherein the layer comprises zirconium oxide having a small proportion of aluminum oxide (see col. 4 lines 42-58 teaching the incorporation of aluminum oxide into the zirconium oxide protective layer having 75% ZrO_2 and 25% Al_2O_3).

Moreover, OGASAWARA teaches the lower protective layer, as in the embodiment of figure 8 being protective layer 22, comprising zirconium oxide (see col. 3 lines 57-60 teaching the protective layer being made of zirconia). Additionally, OGASAWARA teaches the upper protective layer being a porous alumina layer with catalyst particles carried in the alumina layer which would have a large proportion of aluminum oxide than the lower protective layer of FRIESE (see OGASAWARA at col. 7 lines 5-9 teaching the upper protective layer having magnesia particles carried in a porous alumina layer).

Furthermore, FRIESE teaches the benefit of a lower protective layer comprising both zirconia and alumina as claimed over the use of a protective layer comprising only zirconia being that it provides a layer having better adhesion (see col. 4 lines 42-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the zirconia protective layer of OGASAWARA with the

protective layer of FRIESE having zirconia and a small proportion of alumina as claimed.

Regarding claim 12, OGASAWARA teaches the measuring sensor for determining a physical property of a measured gas wherein the measuring sensor is for determining an oxygen concentration in an exhaust gas of an internal combustion engine (see discussion above with respect to claim 11).

Regarding claim 13, OGASAWARA teaches the measuring sensor for determining a physical property of a measured gas wherein the additive is a metal oxide of an alkaline earth group (see discussion above with respect to claim 11).

Regarding claims 14 and 15, OGASAWARA teaches the measuring sensor for determining a physical property of a measured gas wherein the protective layer is extremely porous (see col. 3 lines 54–67 teaching the protective layer being porous) and has a great layer thickness with the thickness of the protective layer being greater than 250 µm (see col. 3 lines 66–67 teaching the protective layer having a thickness of 10 to 500 µm).

Response to Arguments

Applicant's arguments with respect to claims 11-15 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) U.S. Pub. No. 2003/0205468 to Wu et al., teaching a high temperature poison resistant gas sensor.
2) U.S. Pub. No. 2004/0007462 to Hotta et al., teaching a gas sensor element and its production method.
3) U.S. Pub. No. 2004/0117974 to Clyde et al., teaching methods of making gas sensors and sensors formed from those methods.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRYAN D. RIPA whose telephone number is 571-270-7875. The examiner can normally be reached on Monday to Friday, 9:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Harry D Wilkins, III/
Primary Examiner, Art Unit 1795

/B. D. R./
Examiner, Art Unit 1795